

Epidemiologic
Surveillance

1994

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Studies, U.S. Department of
Energy

Annual Report for

**Fernald
Environmental
Management
Project**



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Foreword

The U.S. Department of Energy (DOE) is committed to assuring the health and safety of its workers through the development of epidemiologic surveillance activities. An epidemiologic surveillance program has been implemented at selected DOE sites during the past several years. This approach has been expanded to include surveillance of all medical conditions that result in an absence of 5 or more consecutive workdays, occupational injuries and illnesses, and deaths among active employees. This annual epidemiologic surveillance report provides the final summary of the 12-month period, January 1, 1994, through December 31, 1994, for Fernald Environmental Management Project.

Caution is required when comparing this information with that of other DOE facilities. Interpretation of these data must take into account the occupational medicine program, health and safety practices, the composition of the work force, and potential occupational exposures unique to this facility; therefore, the data presented are pertinent only to the Fernald Environmental Management Project site. Continuing surveillance and data examination may suggest emerging trends that change the preliminary interpretation of the data.

Plans for future annual reports include a discussion of important new findings and changes occurring since previous reports and the incorporation of information from the National Center for Health Statistics and the National Cancer Institute's Surveillance, Epidemiology, and End Results Program. This information will allow early recognition and investigation of possible work

related problems, as well as an analysis of trends over time. In addition, the results of epidemiologic surveillance will be combined with those of medical and exposure surveillance to form an integrated approach to worker health protection.

Fernald at a Glance: 1994

- The size of the Fernald work force remained very stable from 1993 to 1994; the work force grew by less than 1% from its 1993 level.
- As in 1993, diagnosis rates for injuries, musculoskeletal diseases, and respiratory diseases lead the diagnosis rates for Fernald workers. These three categories accounted for 52% of all diagnoses at Fernald during 1994.
- The highest diagnosis rate for men involved injuries, but respiratory diseases again led the diagnosis rates for women. Injuries again ranked fourth among women, following respiratory diseases, musculoskeletal conditions, and pregnancy and childbirth.
- Overall diagnosis rates were about 2.5 times higher for hourly than for salaried workers in 1994, compared with the 4 times higher rates noted for hourly workers in 1993. Among the occupational groups, the highest overall diagnosis rate was among service workers; the lowest among engineers, scientists, and health care workers.
- The rate of OSHA-recordable events was almost 90% higher for women than for men. In 1993, the rate of OSHA-recordable events was about 50% higher among women.
- Diagnosis rates for OSHA-recordable events were over 5 times higher for hourly than salaried workers. The highest rate was among workers in the nuclear specialties; the lowest among engineers, scientists, and health care workers.

Introduction

Epidemiologic surveillance at DOE facilities consists of regular and systematic collection, analysis, and interpretation of data on absences due to illness and injury in the work force. Its purpose is to provide an early warning system about health problems occurring among employees at participating sites. Data are collected by coordinators at each site and submitted to the Epidemiologic Surveillance Data Center, located at the Oak Ridge Institute for Science and Education, where quality control procedures and analyses are carried out. Rates of absences and rates of diagnoses associated with absences are analyzed by occupation and other relevant variables. They may be compared with the disease experience of different groups within the DOE work force and with populations that do not work for DOE to identify disease patterns or clusters that may be associated with work activities.

In this annual report, the 1994 morbidity data for the Fernald site are summarized. These analyses focus on absences of 5 or more consecutive workdays occurring among workers aged 17-73 years. They are arranged in five sets of tables that present: 1) the distribution of the labor force by occupational category and pay status; 2) the absences per person, diagnoses per absence, and diagnosis rates for the whole work force; 3) diagnosis rates by type of disease or injury; 4) diagnosis rates by occupational category; and 5) relative risks for specific types of

disease or injury by occupational category. In addition to this information, the report contains health events that are considered recordable by the Occupational Safety and Health Administration (OSHA). The analyses of the OSHA data are presented in the same format as those presented for absences of 5 or more workdays. OSHA-recordable events are those that occurred on the job and involve fatalities (regardless of the time between the injury and death); lost workday cases other than fatalities; and nonfatal cases without lost workdays resulting in transfer to another job, termination of employment, medical treatment other than first aid, loss of consciousness, or restriction of work or motion. Also recordable are any diagnosed occupational health events reported to the employer that are neither fatal nor result in lost workdays. Deaths occurring among active workers are listed separately; they are not included in any tables. All rates presented in this report are age-adjusted (see glossary) and represent the number of diagnoses reported per 1,000 persons in 1 year.

Throughout this report, the symbol "NA" means "not available" or "not applicable." An empty cell in a table indicates that the value of the cell is zero or that the value cannot be computed.

The tables show the results of analyses of diagnoses resulting from *absences*. An absence is defined as a period of 5 or more consecutive workdays away from work due to some health problem such as an illness or injury. In tables presenting analyses of *diagnoses*, each diagno-

sis is counted because a diagnosis is for a specific illness or injury. A worker can have more than one diagnosis related to one absence from work. For example, a worker's single absence might involve both a back injury and pneumonia. Unlike analyses of absences, analyses of diagnoses focus on the rates of occurrence of specific types of disease and injury. Thus the worker with one absence in which he had a back injury and pneumonia would be counted twice in the analysis of diagnoses, because two separate diagnoses are recorded for this one absence.

The data included in this report are supplemental to, but do not replace, those reported in other safety, industrial hygiene, and health physics reports prepared by DOE. There has been no attempt to validate diagnoses with medical records, pathology, or other laboratory reports. Also, there has been no attempt to validate occupational information reported by the site. For reporting purposes, occupational titles have been grouped into broad categories within which a great deal of diversity in tasks and exposures is likely to exist. Additional material outlining the methods used and explaining the diagnostic categories and frequently used terms can be found on the inside back cover.

Facility Overview

The Fernald Environmental Management Project is located approximately 20 miles northwest of downtown Cincinnati, Ohio, spreading into both Butler and Hamilton Counties. Construction of this complex began in May of 1951 by the Atomic Energy Commission with the mission to process feed materials consisting of uranium ore concentrates and uranium of low grade enrichment into fabricated uranium metal products or reactor core target elements for use by the nation's defense programs. As with many of the early Manhattan Engineer District Sites, the operational direction and oversight were administered through the Office of the Assistant Manager for Defense Programs, Oak Ridge Operations, in Tennessee. The management and operating contractor of the facility began with the

National Lead Company of Ohio in 1951 and was succeeded in January 1986 by the Westinghouse Materials Company of Ohio. In December 1992, management of the site was contracted to the Fernald Environmental Restoration Management Corporation.

First known as the Feed Materials Production Center, operations began in late 1951 with pilot plant work and grew as process buildings were completed. The Feed Materials Production Center used kerosene to dilute tributyl phosphate for the purification of foreign and domestic uranium ores and concentrates by solvent extraction. The facilities were originally designed for depleted uranium, but by 1958 the metals plant was being used for the production of enriched uranium (<1%). In subsequent years there were frequent changes in production requirements, which included production of enriched uranium that was 5 to 10%

U-235. Beginning in January 1954, operations included the production of thorium metal.

Employment at the facility reached its peak in 1956 and slowly decreased until operations halted in July 1989. Much of the employment in the early period of production was due to continued construction of the center, which was completed in 1954.

In June of 1991, Congress approved DOE facility closure and retraining plans. Program management responsibility within DOE was transferred from Defense Programs to the Office of Environmental Restoration and Waste Management. Subsequently, an on-site DOE field office was established to oversee the environmental restoration of the complex.

Labor Force by Occupational Category, 1994

During 1994, there were 2,646 employees (aged 17-73) identified by the Fernald Environmental Management Project as participants in epidemiologic surveillance. Sixty-seven percent (1,774 workers) were men and 33% (872 workers) were women. Eighty-eight percent (2,339 workers) were Caucasian and 10% (256 workers) were African Americans. The remaining 2% (51 workers) included Asians, Hispanics, and Native Americans.

The composition of the labor force by occupational category and salary status is given in Table 1. The occupational categories used in the table are based on the occupation and industry codes created by the Bureau of the Census in 1980. Because workers can change occupational category over the course of a year, workers were counted in the occupational category where they spent most of their time during the year.

Eight workers were on long-term disability for the majority of the year and were not included in the calculations of this annual report.

Seventy-six percent of the workers were salaried, and 24% were hourly. The occupational categories with the largest number of employees were office management and administration (35%); engineers, scientists, and health care (20%); and technical support (13%).

Compared with 1993, the labor force in 1994 increased by 15 employees (0.6%). The biggest increase was among service workers whose numbers increased 57%. The occupational category with the largest

percentage decrease was "other" workers, which decreased 100%, followed by the technical support workers, with a 23.3% decrease from 1993.

	Occupational Category	Number of Workers in 1994	Number of Workers in 1993	% Change from Last Year
Salaried	Office Management and Administration	932	835	+11.6
	Engineers, Scientists, and Health Care	525	456	+15.1
	Technical Support	340	443	-23.3
	Other Management and Administration	210	261	-19.5
	Subtotal	2,007	1,995	+0.6
Hourly	Service	179	114	+57.0
	Crafts and Repair	242	262	-7.6
	Nuclear Specialties	218	224	-2.7
	Other*	0	36	-100.0
	Subtotal	639	636	+0.5
TOTAL	2,646	2,631	+0.6	

Table 1. Labor Force by Occupational Category

* See the 1993 Report for further description of these workers.

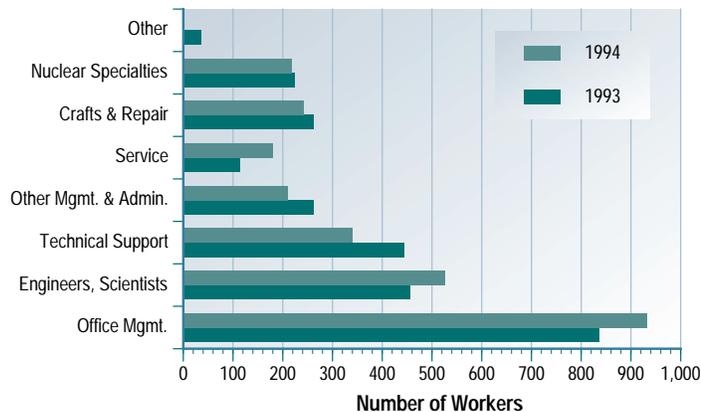


Table 1.A. Change in Labor Force by Year

Absences Among Work Force, 1994

Absences per Person. In 1994, 334 Fernald employees reported an absence of 5 or more consecutive workdays because of illness or injury. Fifty-eight (17%) of these workers had two or more absences. A total of 412 absences were reported by the employees (Table 2.A).

Diagnoses per Absence. A total of 582 diagnoses were associated with the 412 absences of 5 or more consecutive workdays. Multiple diagnoses were reported for 127 (31%) absences (Table 2.B).

Diagnosis Rates. In 1994, 582 diagnoses noted for absences of 5 or more consecutive workdays yielded

an age-adjusted rate of 228.9 diagnoses per 1,000 persons. The diagnosis rate for women (338.8 per 1,000) was more than 1.5 times the rate for men (183.2 per 1,000) (Table 2.C).

Employee Category	Number of Workers	Number of Absences					Total Persons Absent at Least Once	Total Number of Absences
		0	1	2	3	4		
Male	1,774	1,593	152	22	6	1	181	218
Female	872	719	124	20	6	3	153	194
TOTAL	2,646	2,312	276	42	12	4	334	412

Table 2.A.
Absences per Person

Employee Category	Number of Diagnoses per Absence				Total Number of Absences	Total Number of Diagnoses†
	1	2	3	4+		
Male	154	52	9	3	218	297
Female	131	46	14	3	194	285
TOTAL	285	98	23	6	412	582

Table 2.B.
Diagnoses per Absence

Employee Category	Number of Workers	Number of Diagnoses†	Crude Rate per 1,000	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Male	1,774	297	167.4	183.2	162.2	207.0
Female	872	285	326.8	338.8	283.6	404.8
TOTAL	2,646	582	220.0	228.9	209.5	250.0

Table 2.C.
Diagnosis Rates

†Includes all diagnoses reported with an absence of 5 or more days, including absences for pregnancy and delivery.

*Standardized to age distribution of 1970 U.S. population.

Diseases and Injuries by Diagnostic Category, 1994

The age-adjusted diagnosis rate for each diagnostic category is given for all workers in Table 3. Tables 4 and 5 show diagnosis rates by gender to further describe the disease and injury patterns in the work force. Diagnoses associated with pregnancy, labor, and delivery are described in Table 6.

For all workers, the three diagnostic categories with the highest rates were injury and poisoning (39.9 per 1,000), diseases of the musculoskeletal system (38.6 per 1,000), and diseases of the respiratory system (36.7 per 1,000). Together these three categories accounted for 52% of all diagnoses. The disease category of mental disorders (12.3 per 1,000) is of particular importance and will be described further in Tables 4 and 5.

Men. The diagnostic category with the highest rate among men was injury and poisoning (42.2 per 1,000), with 69 diagnoses reported for 56 men. This category accounted for 23% of all diagnoses among men. Within this category, two subcategories had relatively high numbers of diagnoses: sprains and strains and "other" injuries. Sprains and strains accounted for 54% of these diagnoses, with 37 diagnoses among 32 men. Twenty-five diagnoses were sprains and strains of the back: six of the upper body, four of the lower body, and two ill-defined. Four men had multiple diagnoses for sprains and strains of the back and upper body. "Other" injuries accounted for 25% of the injury and poisoning diagnoses, with 17 diagnoses among 14 men. These diagnoses included seven unspecified injuries; three contusions; four complications of

drugs, surgery, or medical care; two late effects of previous injuries; and one abrasion. Two men had multiple diagnoses for contusions and unspecified injuries.

The second highest rate, accounting for 21% of the total diagnoses, was diseases of the musculoskeletal system (38.1 per 1,000), with 61 diagnoses reported for 39 men. Thirty-eight diagnoses were related to dorsopathies (spinal disorders), 12 to joint disease, 9 to rheumatism (excluding the back), and 2 to acquired deformities of the toe. Twenty-two men had multiple diagnoses.

Diseases of the respiratory system (30.1 per 1,000) ranked third, with 50 diagnoses reported for 36 men. Twenty-eight diagnoses were due to upper respiratory diseases. Of these upper respiratory diseases 16 were due to pneumonia/bronchitis, 11 to chronic respiratory conditions, and 1 to other respiratory diseases. Fourteen men had multiple diagnoses.

In addition, the disease category of mental disorders (9.7 per 1,000) had 16 diagnoses among 12 men. There were eight diagnoses for neurotic disorders: three for panic disorders, two for anxiety, two for neurotic depression, and one for an unspecified neurotic disorder. Three diagnoses were due to acute reactions to stress, two to substance dependence, and one diagnosis each was due to a major depressive disorder, a bipolar affective disorder, and a brief depressive reaction. Four men had two diagnoses each.

Two diagnoses related to cancer were reported among two men in 1994: one had Hodgkin's disease, and the other had skin cancer.

Women. The diagnostic category with the highest rate among women was diseases of the respiratory system (64.4 per 1,000), with 44 diagnoses reported among 34 women. This accounted for 15% of all diagnoses among women. Sixteen diagnoses were related to upper respiratory problems, 13 to pneumonia/bronchitis, 10 to chronic respiratory conditions, 3 to pneumothorax (air in the chest cavity), 1 to lung collapse, and 1 to bronchospasm.

The second highest rate, accounting for 14% of the total diagnoses, was for diseases of the musculoskeletal system (43.4 per 1,000), with 40 diagnoses reported for 31 women. Sixteen diagnoses were for rheumatism (excluding the back), 11 for dorsopathies (spinal disorders), and 7 for joint diseases. The remaining six diagnoses were for various musculoskeletal disorders.

Pregnancy and childbirth (32.4 per 1,000) ranked third with 35 diagnoses reported among 29 women. In addition, the disease category of mental disorders (17.4 per 1,000) had 18 diagnoses among 14 women. There were seven diagnoses for depressive disorders, four for neurotic depression, three for acute reactions to stress, and one each for anxiety, major depressive disorder, unspecified drug dependence, and drug withdrawal syndrome. One woman had two diagnoses and another had four diagnoses.

Six diagnoses related to cancer were reported among two women in 1994: one woman had four diagnoses for breast cancer, and the other had one diagnosis each for a malignant neoplasm of the ovary and of the uterus.

Category of Diagnoses	ICD9-CM Code	Number of Diagnoses†	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Infections and parasitic diseases	001-139	9	4.3	2.1	8.8
Malignant neoplasms	140-208, 230-234	8	3.9	1.9	8.0
• Digestive organs	150-159	0			
• Respiratory system	160-165	0			
• Breast	174-175	4	2.2	0.8	6.0
• Genitourinary	179-189	2	0.7	0.2	2.6
• Nervous system	191-192	0			
• Leukemia, lymphoma	200-208	1	0.5	0.1	3.5
Benign neoplasms and other	210-229, 235-239	12	5.0	2.6	9.5
Endocrine and metabolic diseases	240-279	7	2.5	1.2	5.6
Blood and blood-forming organs	280-289	1	0.2	0.0	1.6
Mental disorders	290-319	34	12.3	8.7	17.6
• Alcoholism	303	1	0.6	0.1	4.0
• Drug abuse	304-305	2	0.7	0.2	2.6
Nervous system and sense organs	320-389	19	7.1	4.3	11.6
Circulatory system	390-459	24	12.2	7.9	18.9
• Hypertension	401	4	1.4	0.5	4.1
• Acute myocardial infarction	410	2	1.1	0.3	4.5
• Ischemic disease, not M.I.	411-414, 429.2	7	4.8	2.3	10.2
• Cerebrovascular disease	430-438	0			
Respiratory system	460-519	94	36.7	29.5	45.5
• Upper respiratory	460-465, 470-478	38	13.7	9.8	19.1
• Pneumonia/bronchitis	466, 480-487	29	11.6	7.9	17.2
• Chronic respiratory conditions	490-496	21	9.0	5.7	14.3
Digestive system	520-579	43	17.6	12.6	24.7
• Hernias	550-553	10	5.7	2.9	11.3
• Gall bladder disease	574-575	9	4.0	1.9	8.4
Genitourinary system	580-629	31	12.8	8.6	19.0
• Benign prostatic hypertrophy	600	4	2.8	1.0	7.7
• Endometriosis	617	3	0.8	0.2	2.5
• Ovarian cysts	620.0-620.2	2	0.5	0.1	1.8
• Female genital pain/bleeding	625-626	1	0.2	0.0	1.6
Pregnancy and childbirth ¹	630-676	35	32.4	23.1	45.3
Skin and subcutaneous tissue	680-709	14	5.9	3.4	10.3
Musculoskeletal	710-739	101	38.6	31.2	47.7
• Dorsopathies system	720-724	49	19.3	14.2	26.1
Congenital anomalies	740-759	1	0.5	0.1	3.5
Certain perinatal conditions	760-779	0			
Symptoms, signs, and ill-defined conditions	780-799	25	8.5	5.5	13.1
Injury and poisoning	800-999	105	39.9	32.4	49.1
• Fractures, all sites	800-829	16	5.6	3.3	9.4
• Dislocations	830-839	8	3.0	1.4	6.1
• Sprains and strains	840-848	50	19.3	14.2	26.1
• Intracranial injuries	850-854	1	0.5	0.1	3.5
• Internal injuries	860-869	3	0.7	0.2	2.1
• Open wounds	870-897	3	0.8	0.2	2.5
• Other injuries	900-999	24	10.1	6.6	15.6
Family status/health service contract	V01-V82	19	6.5	4.0	10.5
• Family history of health problems	V10-V19	2	1.0	0.2	3.9
• Circumstances related to reproduction/development	V20-V28	16	5.3	3.2	9.0
• Specific procedure/aftercare	V50-V59	1	0.2	0.0	1.6
Total minus pregnancies		547	214.6	195.9	235.2
TOTAL		582	228.9	209.5	250.0

Table 3.
Diseases and Injuries by Diagnostic Category - Men and Women

† Includes all diagnoses reported with an absence of 5 or more days.

* Standardized to age distribution of 1970 U.S. population.

¹ Only women age 18-45 years were included in the calculation of the rate for this diagnostic category.

Category of Diagnoses	ICD9-CM Code	Number of Diagnoses†	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Infections and parasitic diseases	001-139	3	2.3	0.7	7.5
Malignant neoplasms	140-208, 230-234	2	1.6	0.4	6.6
• Digestive organs	150-159	0			
• Respiratory system	160-165	0			
• Breast	174-175	0			
• Genitourinary	179-189	0			
• Nervous system	191-192	0			
• Leukemia, lymphoma	200-208	1	0.9	0.1	6.6
Benign neoplasms and other	210-229, 235-239	5	3.0	1.2	7.9
Endocrine and metabolic diseases	240-279	3	1.5	0.5	5.0
Blood and blood-forming organs	280-289	1	0.3	0.0	2.5
Mental disorders	290-319	16	9.7	5.7	16.3
• Alcoholism	303	1	0.7	0.1	5.1
• Drug abuse	304-305	1	0.5	0.1	3.3
Nervous system and sense organs	320-389	8	4.3	2.1	9.1
Circulatory system	390-459	19	12.6	7.9	20.1
• Hypertension	401	3	1.5	0.5	5.0
• Acute myocardial infarction	410	2	1.4	0.4	5.7
• Ischemic disease, not M.I.	411-414, 429.2	6	4.7	2.1	10.6
• Cerebrovascular disease	430-438	0			
Respiratory system	460-519	50	30.1	22.4	40.4
• Upper respiratory	460-465, 470-478	22	12.3	7.9	19.3
• Pneumonia/bronchitis	466, 480-487	16	10.6	6.3	17.8
• Chronic respiratory conditions	490-496	11	6.7	3.6	12.4
Digestive system	520-579	21	13.9	8.8	22.1
• Hernias	550-553	9	6.5	3.3	13.0
• Gall bladder disease	574-575	2	1.9	0.5	7.5
Genitourinary system	580-629	14	9.6	5.6	16.6
• Benign prostatic hypertrophy	600	4	3.3	1.2	8.8
• Endometriosis	617	N/A			
• Ovarian cysts	620.0-620.2	N/A			
• Female genital pain/bleeding	625-626	N/A			
Pregnancy and childbirth ¹	630-676	N/A			
Skin and subcutaneous tissue	680-709	10	6.1	3.2	11.7
Musculoskeletal	710-739	61	38.1	29.1	49.9
• Dorsopathies system	720-724	38	23.5	16.7	33.1
Congenital anomalies	740-759	0			
Certain perinatal conditions	760-779	0			
Symptoms, signs, and ill-defined conditions	780-799	15	7.8	4.5	13.6
Injury and poisoning	800-999	69	42.2	32.7	54.5
• Fractures, all sites	800-829	8	5.7	2.7	11.8
• Dislocations	830-839	5	2.4	0.9	6.4
• Sprains and strains	840-848	37	21.9	15.4	31.1
• Intracranial injuries	850-854	1	0.9	0.1	6.6
• Internal injuries	860-869	0			
• Open wounds	870-897	1	0.5	0.1	3.3
• Other injuries	900-999	17	10.8	6.5	18.0
Family status/health service contract	V01-V82	0			
• Family history of health problems	V10-V19	0			
• Circumstances related to reproduction/development	V20-V28	0			
• Specific procedure/aftercare	V50-V59	0			
TOTAL		297	183.2	162.2	207.0

Table 4.
Diseases and Injuries by Diagnostic Category - Men

† Includes all diagnoses reported with an absence of 5 or more days.

* Standardized to age distribution of 1970 U.S. population.

Category of Diagnoses	ICD9-CM Code	Number of Diagnoses†	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Infections and parasitic diseases	001-139	6	14.7	3.7	58.5
Malignant neoplasms	140-208, 230-234	6	12.6	5.4	29.4
• Digestive organs	150-159	0			
• Respiratory system	160-165	0			
• Breast	174-175	4	10.4	3.9	27.8
• Genitourinary	179-189	2	2.2	0.5	8.7
• Nervous system	191-192	0			
• Leukemia, lymphoma	200-208	0			
Benign neoplasms and other	210-229, 235-239	7	9.5	4.0	22.5
Endocrine and metabolic diseases	240-279	4	3.4	1.3	9.3
Blood and blood-forming organs	280-289	0			
Mental disorders	290-319	18	17.4	10.9	27.7
• Alcoholism	303	0			
• Drug abuse	304-305	1	1.1	0.2	7.7
Nervous system and sense organs	320-389	11	11.8	6.1	22.7
Circulatory system	390-459	5	22.8	6.6	78.8
• Hypertension	401	1	1.1	0.2	7.7
• Acute myocardial infarction	410	0			
• Ischemic disease, not M.I.	411-414, 429.2	1	10.1	1.4	72.0
• Cerebrovascular disease	430-438	0			
Respiratory system	460-519	44	64.4	39.4	105.3
• Upper respiratory	460-465, 470-478	16	16.3	9.6	27.9
• Pneumonia/bronchitis	466, 480-487	13	22.7	8.8	58.2
• Chronic respiratory conditions	490-496	10	20.5	7.3	57.8
Digestive system	520-579	22	20.0	13.1	30.7
• Hernias	550-553	1	1.0	0.1	7.3
• Gall bladder disease	574-575	7	6.3	3.0	13.4
Genitourinary system	580-629	17	23.6	9.7	57.4
• Benign prostatic hypertrophy	600	N/A			
• Endometriosis	617	3	2.5	0.8	7.9
• Ovarian cysts	620.0-620.2	2	1.4	0.3	5.6
• Female genital pain/bleeding	625-626	1	0.7	0.1	4.9
Pregnancy and childbirth ¹	630-676	35	32.4	23.1	45.3
Skin and subcutaneous tissue	680-709	4	3.8	1.4	10.3
Musculoskeletal	710-739	40	43.4	30.4	61.8
• Dorsopathies system	720-724	11	13.0	6.5	25.8
Congenital anomalies	740-759	1	1.0	0.1	7.3
Certain perinatal conditions	760-779	0			
Symptoms, signs, and ill-defined conditions	780-799	10	10.4	5.1	20.9
Injury and poisoning	800-999	36	31.6	22.6	44.0
• Fractures, all sites	800-829	8	6.3	3.1	12.7
• Dislocations	830-839	3	3.1	1.0	9.5
• Sprains and strains	840-848	13	11.8	6.8	20.5
• Intracranial injuries	850-854	0			
• Internal injuries	860-869	3	2.1	0.7	6.5
• Open wounds	870-897	2	1.4	0.3	5.6
• Other injuries	900-999	7	6.9	3.3	14.6
Family status/health service contract	V01-V82	19	16.3	10.3	25.7
• Family history of health problems	V10-V19	2	2.1	0.5	8.2
• Circumstances related to reproduction/development	V20-V28	16	13.5	8.2	22.3
• Specific procedure/aftercare	V50-V59	1	0.7	0.1	4.9
Total minus pregnancies		250	306.5	252.6	372.0
TOTAL		285	338.8	283.6	404.8

Table 5.
Diseases and
Injuries
by Diagnostic
Category - Women

† Includes all diagnoses reported with an absence of 5 or more days.

* Standardized to age distribution of 1970 U.S. population.

¹ Only women age 18-45 years were included in the calculation of the rate for this diagnostic category.

Diagnoses Associated with Pregnancy, Labor, and Delivery

During 1994, 35 pregnancy-related diagnoses were reported among 29 women (Table 6). Four women had multiple diagnoses. There were 12 diagnoses for complications related to pregnancy, three for ectopic and molar pregnancy/abortive outcomes, and two for other indications in pregnancy, labor, and delivery. Eighteen women had normal deliveries.

Diagnoses by Occupational Category, 1994

During 1994, the age-adjusted diagnosis rate for all employees (Table 7) was more than 2.5 times higher among hourly workers than salaried workers (435.4 versus 158.9 per 1,000 persons). Service workers, who comprised 6.8% of the work force, had the highest diagnosis rate (518.8 per 1,000), with 89 diagnoses reported for 43 workers. Nuclear specialty workers had the second highest diagnosis rate (464.4 per

1,000), with 103 diagnoses reported among 53 persons. Crafts and repair workers ranked third, with 77 diagnoses reported for 50 workers (335.2 per 1,000). Engineers, scientists, and health care workers had the lowest rate (104.6 per 1,000 workers), with 49 diagnoses among 34 workers.

Men. The diagnosis rate among men was over 3.5 times higher for hourly workers (362.7 per 1,000) than for salaried workers (99.0 per 1,000) (Table 8). Service workers had the highest rate (398.6 per 1,000), with 45 diagnoses reported for 25 men. The second highest rate was among the nuclear specialty workers (381.6 per 1,000), with 75 diagnoses reported among 40 men. Crafts and repair workers ranked third, with 67 diagnoses reported among 41 men (316.4 per 1,000). Office management and administrative workers had the lowest rate (65.9 per 1,000), with 27 diagnoses for 19 men.

Women. The diagnosis rate among women was almost 3 times higher for hourly workers (813.7 per 1,000) than for salaried workers (275.7 per 1,000) (Table 9). Nuclear specialty workers had the highest rate (977.1 per 1,000), with 28 diagnoses reported among 13 women. The second highest rate was among service workers (739.7 per 1,000), with 44 diagnoses reported among 18 women. Crafts and repair workers ranked third, with 10 diagnoses reported among 9 women (404.1 per 1,000). Other management and administrative workers had the lowest rate (226.5 per 1,000), with 19 diagnoses among 11 women. Women had higher diagnosis rates than men; this suggests a greater tendency among women to report injury or illness.

Category of Diagnoses	ICD9-CM Code	Number of Diagnoses†	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Ectopic and Molar Pregnancy/Abortive Outcome	630-639	3	3.1	1.0	9.6
Complications Related to Pregnancy	640-648	12	12.0	6.8	21.2
Normal Delivery	650	18	15.2	9.5	24.3
Other Indications for Care in Pregnancy, Labor, and Delivery‡	651-659	2	2.1	0.5	8.2
Complications of Labor, Delivery, and Puerperium	660-676	0			
TOTAL		35	32.4	23.1	45.3

Table 6.
Diagnoses Associated with Pregnancy, Labor, and Delivery

†Includes all diagnoses reported with an absence of 5 or more days.

*Only women aged 18-45 were included in the calculation of the rates for these diagnostic categories.

‡Includes delivery by cesarian section and multiple births.

	Occupational Category	Number of Workers	Number of Diagnoses†	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Salaried	Office Management and Administration	932	153	169.8	140.6	204.9
	Engineers, Scientists, and Health Care	525	49	104.6	76.6	142.8
	Technical Support	340	73	202.2	153.3	266.6
	Other Management and Administration	210	38	187.1	132.0	265.0
	Subtotal	2,007	313	158.9	140.5	179.7
Hourly	Service	179	89	518.8	415.7	647.3
	Crafts and Repair	242	77	335.2	264.6	424.6
	Nuclear Specialties	218	103	464.4	377.7	570.9
	Subtotal	639	269	435.4	384.0	493.6
TOTAL	2,646	582	228.9	209.5	250.0	

Table 7.
Diagnoses by Occupational Category - Men and Women

	Occupational Category	Number of Workers	Number of Diagnoses†	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Salaried	Office Management and Administration	466	27	65.9	43.0	101.0
	Engineers, Scientists, and Health Care	427	31	79.1	53.9	116.0
	Technical Support	210	33	111.3	76.5	162.0
	Other Management and Administration	133	19	209.2	96.1	455.3
	Subtotal	1,236	110	99.0	80.8	121.3
Hourly	Service	123	45	398.6	293.6	541.2
	Crafts and Repair	226	67	316.4	245.5	407.8
	Nuclear Specialties	189	75	381.6	299.5	486.2
	Subtotal	538	187	362.7	312.3	421.3
TOTAL	1,774	297	183.2	162.2	207.0	

Table 8.
Diagnoses by Occupational Category - Men

	Occupational Category	Number of Workers	Number of Diagnoses†	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Salaried	Office Management and Administration	466	126	270.6	208.6	351.1
	Engineers, Scientists, and Health Care	98	18	252.8	131.6	485.9
	Technical Support	130	40	327.3	219.1	488.9
	Other Management and Administration	77	19	226.5	144.4	355.3
	Subtotal	771	203	275.7	221.2	343.7
Hourly	Service	56	44	739.7	520.2	1,051.8
	Crafts and Repair	16	10	404.1	204.9	797.1
	Nuclear Specialties	29	28	977.1	655.9	1,455.8
	Subtotal	101	82	813.7	610.5	1,084.5
TOTAL	872	285	338.8	283.6	404.8	

Table 9.
Diagnoses by Occupational Category - Women

† Includes all diagnoses reported with an absence of 5 or more days, including absences for pregnancy and delivery.

* Standardized to age distribution of 1970 U.S. population.

Relative Risk for Selected Disease and Injury Categories by Occupation

Table 10 presents the relative risks of absences of 5 or more consecutive workdays for selected disease categories among workers by each occupational category.

Service workers were significantly more likely to be absent at least once during 1994 for diseases of the nervous system (RR=5.5); diseases of the circulatory system (RR=4.9); diseases of the musculoskeletal system (RR=3.1); symptoms, signs, and ill-defined conditions (RR=5.4);

injury and poisoning (RR=2.9), as a whole; and sprains and strains (RR=2.9) and “other” injuries (RR=3.5), as subcategories of injury and poisoning. Crafts and repair workers were significantly more likely to be absent at least once during 1994 for mental disorders (RR=3.2); diseases of the respiratory system (RR=2.3); diseases of the digestive system (RR=4.2); diseases of the musculoskeletal system (RR=2.5); injury and poisoning (RR=2.2), as a whole; and sprains and strains (RR=2.5), as a subcategory of injury and poisoning.

Nuclear specialty workers were found to have a statistically significant elevated risk associated with benign neoplasms (RR=5.7); mental disorders (RR=4.6); diseases of the nervous system (RR=5.1); diseases of the circulatory system (RR=3.0); diseases of the respiratory system (RR=2.5); diseases of the musculoskeletal system (RR=4.0); injury and poisoning (RR=3.5), as a whole; and sprains and strains (RR=4.3), as a subcategory of injury and poisoning.

Disease	Office Management and Administration 932 Person-Years				Engineers, Scientists, and Health Care 525 Person-Years				Technical Support 340 Person-Years				Other Management and Administration 210 Person-Years			
	Persons with at Least One Event*	Relative Risk**	Confidence Limit		Persons with at Least One Event*	Relative Risk**	Confidence Limit		Persons with at Least One Event*	Relative Risk**	Confidence Limit		Persons with at Least One Event*	Relative Risk**	Confidence Limit	
			Lower 95%	Upper 95%			Lower 95%	Upper 95%			Lower 95%	Upper 95%			Lower 95%	Upper 95%
Malignant Neoplasms	2		1.6	0.3	9.6	2	6.3	0.9	43.3	0						
Benign Neoplasms	2		0.3	0.1	1.3	3	1.9	0.5	6.9	2	1.7	0.3	8.6			
Mental Disorders	5		0.3	0.1	0.9	2	0.4	0.1	1.7	1	0.2	0.03	1.8			
Nervous System/Sense Organs	3		0.2	0.1	1.0	1	1	0.3	2.1	1	0.4	0.1	3.3			
Circulatory System	3		0.3	0.1	1.1	4	0.8	0.3	2.5	1	0.5	0.1	4.9			
Respiratory System	17		0.4	0.2	0.8	6	0.4	0.2	1.1	10	1.2	0.6	2.3			
Digestive System	11		0.7	0.3	1.6	1	0.1	0.02	1.0	8	1.8	0.8	3.9			
Genitourinary System	9		0.9	0.4	2.0	2	0.5	0.1	2.0	2	0.8	0.2	3.2			
Musculoskeletal System	16		0.5	0.3	0.8	3	0.2	0.1	0.6	6	0.6	0.3	1.5			
Symptoms, Signs and Ill-Defined Conditions	3		0.3	0.1	1.0	2	0.4	0.1	1.7	3	1.0	0.3	3.2			
Injury and Poisoning	10		0.3	0.1	0.6	5	0.3	0.1	0.7	12	1.2	0.6	2.3			
Injury and Poisoning: Sprains and Strains	3		0.2	0.05	0.6	2	0.2	0.05	0.8	5	0.9	0.3	2.6			
Injury and Poisoning: “Other” Injuries	3		0.4	0.1	1.3	0				5	2.2	0.8	6.7			
Total Events per Occupation		87				33				56						

* Persons with multiple absences during the time period were counted only once.

** Adjusted for age and gender — compared with all occupational categories.

The lower overall diagnosis rates observed among salaried workers were also apparent in the relative risk analyses. Office management and administrative personnel were significantly less likely to be absent at least once during 1994 for mental disorders (RR=0.3); diseases of the respiratory system (RR=0.4); diseases of the musculoskeletal system (R=0.5); injury and poisoning (RR=0.3), as a whole; and sprains and strains (RR=0.2), as a subcategory of injury and poisoning. Engineers, scientists, and health care workers had a statistically

significant decreased risk of diseases of the musculoskeletal system (RR=0.2); injury and poisoning (RR=0.3), as a whole; and sprains and strains (RR=0.2), as a subcategory of injury and poisoning.

The reasons for the large differences in overall diagnosis rates and relative risks for particular diagnostic categories among different occupational categories may be due to small numbers. However, the

consistency of the differences across broad diagnostic categories suggests that compliance with reporting back to work through an occupational physician varies among occupational categories.

Table 10.
Relative Risk for Selected Disease and Injury Categories by Occupation

Other Management and Administration 210 Person-Years				Service 179 Person-Years				Crafts and Repair 242 Person-Years				Nuclear Specialties 218 Person-Years				Total Events per Disease	
Persons with at Least One Event*	Relative Risk**	Confidence Limit		Persons with at Least One Event*	Relative Risk**	Confidence Limit		Persons with at Least One Event*	Relative Risk**	Confidence Limit		Persons with at Least One Event*	Relative Risk**	Confidence Limit			
		Lower 95%	Upper 95%			Lower 95%	Upper 95%			Lower 95%	Upper 95%			Lower 95%	Upper 95%		
0				0				0				0				4	
8.6	1	0.9	0.1	6.5	0			0				3	5.7	1.4	24.0	11	
1.8	3	1.6	0.5	5.2	4	2.5	0.9	7.5	5	3.2	1.2	8.0	6	4.6	1.8	11.9	26
3.3	1	0.6	0.1	4.6	5	5.5	1.9	15.7	2	1.6	0.4	7.1	5	5.1	1.9	13.7	18
4.9	1	0.5	0.1	3.2	6	4.9	1.9	12.3	2	0.7	0.2	2.8	5	3.0	1.1	7.9	22
2.3	6	1.0	0.4	2.4	9	2.0	1.0	4.0	11	2.3	1.2	4.5	11	2.5	1.3	4.8	70
3.9	0				2	0.8	0.2	3.5	7	4.2	1.6	11.0	5	2.5	1.0	6.4	34
3.2	4	2.2	0.8	6.2	2	1.3	0.3	5.6	1	0.5	0.1	3.9	3	2.3	0.6	8.3	23
1.5	3	0.5	0.2	1.6	13	3.1	1.7	5.7	12	2.5	1.3	4.9	17	4.0	2.3	7.0	70
3.2	3	2.1	0.6	7.1	6	5.4	2.1	14.3	2	1.3	0.3	5.5	2	1.3	0.3	5.5	21
2.3	1	0.2	0.02	1.4	13	2.9	1.6	5.2	14	2.2	1.2	4.0	18	3.5	2.0	6.0	73
2.6	1	0.3	0.04	2.5	7	2.9	1.3	6.5	9	2.5	1.2	5.4	12	4.3	2.2	8.5	39
6.7	0				4	3.5	1.2	10.3	3	1.8	0.5	6.8	4	3.0	1.0	9.4	19
	24				71				68				91				430

Deaths Among Active Workers, 1994

During 1994, one death was reported among active employees; however, the cause of death was not provided.

Relative Risk for All Diseases and Injuries by Occupation

In Tables 10 and 11, the risk of one or more absences associated with selected diagnostic categories for specific occupational categories is compared with all other occupational categories in the Fernald work force. This comparison takes into account the possible confounding effects of age and gender. In contrast to the previous series of tables, these analyses examine the risk of a worker having one or more absences for 5 or more consecutive workdays during 1994. This was done to minimize the problem associated with one person having multiple absences for the same condition.

Throughout this report, various tables and discussions refer to rates of illness or injury. Rates in this report reflect the number of events (e.g., absences, diagnoses) per 1,000 "person-years." A "person-year" is a unit of measurement combining persons and time; it is equivalent to one person followed up for one year. When an individual worker remains in the work force for the entire year,

she or he contributes one person-year to the calculation of rates of disease and injury presented in the report. Rates of disease and injury are often presented as the number of diagnoses or absences from work per thousand workers per year, or per 1,000 person-years.

The statistical methods used to compare the incidence of absences are the relative risk and the 95% confidence interval.

The relative risk is the rate of absence in one group divided by the rate in a reference (comparison) group. The reference group is all workers other than the occupational category of primary interest. A relative risk of 1.0 indicates that both groups have the same risk of absence. A relative risk *greater than* 1.0 indicates that workers in a selected occupational category have a higher risk of absence than workers in all other occupational categories combined. A relative risk *less than* 1.0 implies that the selected occupational group has a lower risk of absence compared with all other occupational categories combined.

The confidence interval is a statistical measure of the precision of the risk estimate. A 95% confidence

interval indicates the range in which one would expect the relative risk to fall 95% of the time. If the confidence interval includes the value 1.0, then the rate of absence is likely to have occurred by chance; in other words, the relative risk is not statistically significant at the 95% confidence level. For example, a relative risk of 2.0 with a confidence interval of 0.9 to 2.1 would not be considered statistically significant, whereas a relative risk of 1.4 with a confidence interval of 1.2 to 1.7 would be considered statistically significant. The width of the confidence interval indicates the amount of uncertainty in the risk estimate and is affected by sample size and the number of events in the diagnostic category.

Service workers (relative risk [RR]=2.0), crafts and repair workers (RR=2.1), and nuclear specialties workers (RR=2.5) had a statistically significant increased risk of being absent 5 or more consecutive workdays in 1994 due to disease or injury (Table 11). Office management and administrative workers (RR=0.5), and engineers, scientists, and health care workers (RR=0.5) had a statistically significant decreased risk of absence.

Occupational Category	Person-Years	Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Office Management and Administration	932	88	0.5	0.4	0.7
Engineers, Scientists, and Health Care	525	34	0.5	0.3	0.7
Technical Support	340	43	1.0	0.7	1.3
Other Management and Administration	210	23	0.9	0.6	1.3
Service	179	43	2.0	1.5	2.8
Crafts and Repair	242	50	2.1	1.5	2.9
Nuclear Specialties	218	53	2.5	1.9	3.4
TOTAL	2,646	334			

Table 11.
All Diseases and Injuries by Occupational Categories

* Persons with multiple absences during the time period were counted only once.
** Adjusted for age and gender – compared with all occupational categories.

OSHA-Recordable Events Among Fernald Employees, 1994

OSHA-Recordable Events per Person. In 1994, 71 Fernald employees had an OSHA-recordable event. Three (4%) of these workers had two events. There was a total of 74 OSHA-recordable events among all employees (Table 12.A).

Diagnoses per OSHA-Recordable Event. A total of 80 diagnoses were associated with the 74 OSHA-recordable events recorded during 1994. Multiple diagnoses were reported for six (8%) of the events (Table 12.B).

Diagnosis Rates for OSHA-Recordable Events. In 1994, the 80 diagnoses noted for the OSHA-recordable events yielded an age-adjusted rate of 31.5 per 1,000 persons. The age-adjusted diagnosis rate for women (53.3 per 1,000) was almost twice as high as the rate for men (28.1 per 1,000) (Table 12.C).

Employee Category	Number of Workers	Number of OSHA-Recordable Events					Total Persons with at Least One Event	Total Number of Events
		0	1	2	3	4		
Male	1,774	1,731	42	1	0	0	43	44
Female	872	844	26	2	0	0	28	30
TOTAL	2,646	2,575	68	3	0	0	71	74

*Table 12.A.
OSHA-Recordable Events per Person*

Employee Category	Number of Diagnoses per OSHA Event					Total Number of Events	Total Number of Diagnoses
	1	2	3	4	5		
Male	40	4	0	0	0	44	48
Female	28	2	0	0	0	30	32
TOTAL	68	6	0	0	0	74	80

*Table 12.B.
Diagnoses per OSHA-Recordable Event*

Employee Category	Number of Workers	Number of Diagnoses	Crude Rate per 1,000	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Male	1,774	48	27.1	28.1	20.7	38.1
Female	872	32	36.7	53.3	32.4	87.6
TOTAL	2,646	80	30.2	31.5	24.9	39.9

*Table 12.C.
Diagnosis Rates for OSHA-Recordable Events*

*Standardized to age distribution of 1970 U.S. population.

OSHA-Recordable Diseases and Injuries by Diagnostic Category, 1994

The age-adjusted diagnosis rate for each diagnostic category is presented for all workers in Table 13. Tables 14 and 15 show diagnosis rates by gender to further describe the disease and injury patterns in the work force.

For all workers, the diagnostic category with the highest rate was injury and poisoning (22.8 per 1,000), with 56 diagnoses reported for 53 people. This category accounted for 70% of all the diagnoses. Within this category were two subcategories with relatively higher rates. These were sprains and strains (9.2 per 1,000), with 22 diagnoses for 22 workers, and "other" injuries (9.2 per 1,000), with 24 diagnoses for 23 workers.

Men. The leading diagnostic category among men (Table 14), accounting for 79% of all diagnoses, was injury and poisoning (22.4 per 1,000), with 38 diagnoses among 36 men. Within this category were two subcategories with relatively higher rates. Sprains and strains (9.2 per 1,000) accounted for 42% of the diagnoses, with 16 diagnoses among 16 men. Thirteen diagnoses involved the back and three involved the shoulder and arm. "Other" injuries (9.7 per 1,000) accounted for 45% of the injury and poisoning diagnoses, with 17 diagnoses among 17 men. These included four diagnoses due to effects of heat, four contusions, four foreign bodies on the eye, three second degree burns (one each to the ear, face/head, and ankle), one toxic effect of nitrogen oxide(s) gases or fumes, and one insect bite to the upper extremity.

Women. The diagnostic category with the highest rate was the same among women as for men. Injury and poisoning (35.6 per 1,000) accounted for 56% of all diagnoses, with 18 diagnoses among 17 women. Within this category were two subcategories with relatively higher rates. Sprains and strains (16.6 per 1,000) accounted for 33% of the diagnoses, with six diagnoses for six women. Four of these strains were in the extremities and two were in the back. "Other" injuries (9.1 per 1,000) accounted for 39%, with seven diagnoses for six women. These included three diagnoses due to effects of heat, two contusions of the knee, one second degree burn to the forearm, and one toxic effect of a non-medicinal substance. One woman had multiple diagnoses for heat effects.

Category of Diagnoses	ICD9-CM Code	Number of Diagnoses†	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Infections and parasitic diseases	001-139	1	0.5	0.1	3.5
Malignant neoplasms	140-208, 230-234	0			
• Digestive organs	150-159	0			
• Respiratory system	160-165	0			
• Breast	174-175	0			
• Genitourinary	179-189	0			
• Nervous system	191-192	0			
• Leukemia, lymphoma	200-208	0			
Benign neoplasms and other	210-229, 235-239	0			
Endocrine and metabolic diseases	240-279	0			
Blood and blood-forming organs	280-289	0			
Mental disorders	290-319	0			
• Alcoholism	303	0			
• Drug abuse	304-305	0			
Nervous system and sense organs	320-389	2	0.5	0.1	1.8
Circulatory system	390-459	0			
• Hypertension	401	0			
• Acute myocardial infarction	410	0			
• Ischemic disease, not M.I.	411-414, 429.2	0			
• Cerebrovascular disease	430-438	0			
Respiratory system	460-519	1	0.3	0.0	2.3
• Upper respiratory	460-465, 470-478	0			
• Pneumonia/bronchitis	466, 480-487	0			
• Chronic respiratory conditions	490-496	0			
Digestive system	520-579	1	0.2	0.0	1.6
• Hernias	550-553	1	0.2	0.0	1.6
• Gall bladder disease	574-575	0			
Genitourinary system	580-629	0			
• Benign prostatic hypertrophy	600	0			
• Endometriosis	617	0			
• Ovarian cysts	620.0-620.2	0			
• Female genital pain/bleeding	625-626	0			
Pregnancy and childbirth ¹	630-676	0			
Skin and subcutaneous tissue	680-709	6	2.2	0.9	5.0
Musculoskeletal	710-739	9	3.4	1.7	6.7
• Dorsopathies system	720-724	1	0.2	0.0	1.6
Congenital anomalies	740-759	1	0.3	0.0	2.3
Certain perinatal conditions	760-779	0			
Symptoms, signs, and ill-defined conditions	780-799	2	0.9	0.2	3.7
Injury and poisoning	800-999	56	22.8	17.2	30.3
• Fractures, all sites	800-829	4	2.2	0.8	5.8
• Dislocations	830-839	0			
• Sprains and strains	840-848	22	9.2	5.8	14.4
• Intracranial injuries	850-854	0			
• Internal injuries	860-869	0			
• Open wounds	870-897	6	2.3	1.0	5.3
• Other injuries	900-999	24	9.2	5.9	14.1
Family status/health service contract	V01-V82	1	0.5	0.1	3.5
• Family history of health problems	V10-V19	1	0.5	0.1	3.5
• Circumstances related to reproduction/development	V20-V28	0			
• Specific procedure/aftercare	V50-V59	0			
Total minus pregnancies		80	31.5	24.9	39.9
TOTAL		80	31.5	24.9	39.9

Table 13.
OSHA-
Recordable
Diseases and
Injuries by
Diagnostic
Category - Men
and Women

† Includes all diagnoses reported with an absence of 5 or more days.

* Standardized to age distribution of 1970 U.S. population.

¹ Only women age 18-45 years were included in the calculation of the rate for this diagnostic category.

Category of Diagnoses	ICD9-CM Code	Number of Diagnoses†	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Infections and parasitic diseases	001-139	1	0.9	0.1	6.6
Malignant neoplasms	140-208, 230-234	0			
• Digestive organs	150-159	0			
• Respiratory system	160-165	0			
• Breast	174-175	0			
• Genitourinary	179-189	0			
• Nervous system	191-192	0			
• Leukemia, lymphoma	200-208	0			
Benign neoplasms and other	210-229, 235-239	0			
Endocrine and metabolic diseases	240-279	0			
Blood and blood-forming organs	280-289	0			
Mental disorders	290-319	0			
• Alcoholism	303	0			
• Drug abuse	304-305	0			
Nervous system and sense organs	320-389	0			
Circulatory system	390-459	0			
• Hypertension	401	0			
• Acute myocardial infarction	410	0			
• Ischemic disease, not M.I.	411-414, 429.2	0			
• Cerebrovascular disease	430-438	0			
Respiratory system	460-519	1	0.5	0.1	3.3
• Upper respiratory	460-465, 470-478	0			
• Pneumonia/bronchitis	466, 480-487	0			
• Chronic respiratory conditions	490-496	0			
Digestive system	520-579	1	0.3	0.0	2.5
• Hernias	550-553	1	0.3	0.0	2.5
• Gall bladder disease	574-575	0			
Genitourinary system	580-629	0			
• Benign prostatic hypertrophy	600	0			
• Endometriosis	617	N/A			
• Ovarian cysts	620.0-620.2	N/A			
• Female genital pain/bleeding	625-626	N/A			
Pregnancy and childbirth ¹	630-676	N/A			
Skin and subcutaneous tissue	680-709	3	1.6	0.5	5.7
Musculoskeletal	710-739	1	0.5	0.1	3.3
• Dorsopathies system	720-724	0			
Congenital anomalies	740-759	1	0.5	0.1	3.3
Certain perinatal conditions	760-779	0			
Symptoms, signs, and ill-defined conditions	780-799	1	0.5	0.1	3.3
Injury and poisoning	800-999	38	22.4	15.9	31.5
• Fractures, all sites	800-829	0			
• Dislocations	830-839	0			
• Sprains and strains	840-848	16	9.2	5.4	15.6
• Intracranial injuries	850-854	0			
• Internal injuries	860-869	0			
• Open wounds	870-897	5	3.6	1.4	9.1
• Other injuries	900-999	17	9.7	5.8	16.0
Family status/health service contract	V01-V82	1	0.9	0.1	6.6
• Family history of health problems	V10-V19	1	0.9	0.1	6.6
• Circumstances related to reproduction/development	V20-V28	0			
• Specific procedure/aftercare	V50-V59	0			
TOTAL		48	28.1	20.7	38.1

Table 14.
OSHA-
Recordable
Diseases and
Injuries by
Diagnostic
Category - Men

† Includes all diagnoses reported with an absence of 5 or more days.

* Standardized to age distribution of 1970 U.S. population.

Category of Diagnoses	ICD9-CM Code	Number of Diagnoses†	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Infections and parasitic diseases	001-139	0			
Malignant neoplasms	140-208, 230-234	0			
• Digestive organs	150-159	0			
• Respiratory system	160-165	0			
• Breast	174-175	0			
• Genitourinary	179-189	0			
• Nervous system	191-192	0			
• Leukemia, lymphoma	200-208	0			
Benign neoplasms and other	210-229, 235-239	0			
Endocrine and metabolic diseases	240-279	0			
Blood and blood-forming organs	280-289	0			
Mental disorders	290-319	0			
• Alcoholism	303	0			
• Drug abuse	304-305	0			
Nervous system and sense organs	320-389	2	1.4	0.3	5.6
Circulatory system	390-459	0			
• Hypertension	401	0			
• Acute myocardial infarction	410	0			
• Ischemic disease, not M.I.	411-414, 429.2	0			
• Cerebrovascular disease	430-438	0			
Respiratory system	460-519	0			
• Upper respiratory	460-465, 470-478	0			
• Pneumonia/bronchitis	466, 480-487	0			
• Chronic respiratory conditions	490-496	0			
Digestive system	520-579	0			
• Hernias	550-553	0			
• Gall bladder disease	574-575	0			
Genitourinary system	580-629	0			
• Benign prostatic hypertrophy	600	N/A			
• Endometriosis	617	0			
• Ovarian cysts	620.0-620.2	0			
• Female genital pain/bleeding	625-626	0			
Pregnancy and childbirth ¹	630-676	0			
Skin and subcutaneous tissue	680-709	3	4.8	1.4	16.6
Musculoskeletal	710-739	8	8.9	4.0	19.4
• Dorsopathies system	720-724	1	0.7	0.1	4.9
Congenital anomalies	740-759	0			
Certain perinatal conditions	760-779	0			
Symptoms, signs, and ill-defined conditions	780-799	1	2.6	0.4	18.5
Injury and poisoning	800-999	18	35.6	18.0	70.4
• Fractures, all sites	800-829	4	8.9	3.2	24.7
• Dislocations	830-839	0			
• Sprains and strains	840-848	6	16.6	4.7	58.4
• Intracranial injuries	850-854	0			
• Internal injuries	860-869	0			
• Open wounds	870-897	1	1.1	0.2	7.7
• Other injuries	900-999	7	9.1	3.8	22.0
Family status/health service contract	V01-V82	0			
• Family history of health problems	V10-V19	0			
• Circumstances related to reproduction/development	V20-V28	0			
• Specific procedure/aftercare	V50-V59	0			
Total minus pregnancies		32	53.3	32.4	87.6
TOTAL		32	53.3	32.4	87.6

Table 15.
OSHA-
Recordable
Diseases and
Injuries by
Diagnostic
Category -
Women

† Includes all diagnoses reported with an absence of 5 or more days.
* Standardized to age distribution of 1970 U.S. population.

OSHA-Recordable Diagnoses by Occupational Category, 1994

During 1994, the age-adjusted diagnosis rate among all employees (Table 16) was more than 4 times higher for hourly workers than for salaried workers (71.5 versus 17.5 per 1,000 persons). Nuclear specialty workers, who comprised 8% of the work force, had the highest diagnosis rate (82.9 per 1,000), with 17 diagnoses reported for 16 persons. The second highest diagnosis rate was among craft and repair workers (72.3 per 1,000), with 19 diagnoses for 15 persons. Service workers ranked third, with 11 diagnoses among 10 workers (64.4 per 1,000). The diagnosis rate for workers in the category of engineers, scientists, and health care workers was substantially lower than all other occupational categories (7.7 per 1,000 workers), with four diagnoses for three workers.

Men. The diagnosis rate among men (Table 17) was more than 5.5 times higher for hourly workers (64.3 per 1,000) than for salaried workers (11.4 per 1,000). Nuclear specialty workers had the highest rate (78.1 per 1,000), with 14 diagnoses reported for 13 men. Craft and repair workers ranked second (66.4 per 1,000), with 16 diagnoses among 13 men. Service workers followed, with five diagnoses for five men (33.2 per 1,000). The lowest diagnosis rate for men was among the other management and administration workers (4.6 per 1,000), with one diagnosis for one man.

Women. The diagnosis rate among women (Table 18) was more than 5.5 times higher for hourly workers (188.8 per 1,000) than for salaried workers (32.3 per 1,000).

The diagnosis rate for workers in the service category (200.1 per 1,000) was the highest, with six diagnoses reported among five women. Technical support workers (97.1 per 1,000) ranked second, with nine diagnoses among eight women. The third highest rate occurred among craft and repair workers (91.0 per 1,000), with three diagnoses for two women. The diagnosis rate was the lowest for engineers, scientists, and health care workers who had no OSHA-recordable events.

	Occupational Category	Number of Workers	Number of Diagnoses†	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Salaried	Office Management and Administration	932	11	12.3	6.6	22.8
	Engineers, Scientists, and Health Care	525	4	7.7	2.7	22.1
	Technical Support	340	15	48.9	25.4	94.3
	Other Management and Administration	210	3	12.1	3.9	37.9
	Subtotal	2,007	33	17.5	12.2	25.1
Hourly	Service	179	11	64.4	33.9	122.5
	Crafts and Repair	242	19	72.3	45.1	116.0
	Nuclear Specialties	218	17	82.9	49.6	138.6
	Subtotal	639	47	71.5	53.0	96.6
TOTAL	2,646	80	31.5	24.9	39.9	

Table 16.
OSHA Diagnoses by Occupational Category - Men and Women

	Occupational Category	Number of Workers	Number of Diagnoses†	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Salaried	Office Management and Administration	466	2	5.9	1.3	27.6
	Engineers, Scientists, and Health Care	427	4	8.8	3.1	24.8
	Technical Support	210	6	24.5	9.9	60.7
	Other Management and Administration	133	1	4.6	0.7	32.9
	Subtotal	1,236	13	11.4	6.3	20.5
Hourly	Service	123	5	33.2	13.2	83.4
	Crafts and Repair	226	16	66.4	39.6	111.5
	Nuclear Specialties	189	14	78.1	44.6	137.0
	Subtotal	538	35	64.3	45.4	91.0
TOTAL	1,774	48	28.1	20.7	38.1	

Table 17.
OSHA Diagnoses by Occupational Category - Men

	Occupational Category	Number of Workers	Number of Diagnoses†	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Salaried	Office Management and Administration	466	9	21.8	10.1	46.7
	Engineers, Scientists, and Health Care	98	0			
	Technical Support	130	9	97.1	40.8	231.0
	Other Management and Administration	77	2	28.4	7.1	113.4
	Subtotal	771	20	32.3	19.4	53.8
Hourly	Service	56	6	200.1	74.2	539.8
	Crafts and Repair	16	3	91.0	29.3	282.1
	Nuclear Specialties	29	3	83.5	26.7	261.6
	Subtotal	101	12	188.8	75.0	475.7
TOTAL	872	32	53.3	32.4	87.6	

Table 18.
OSHA Diagnoses by Occupational Category - Women

† Includes all diagnoses reported with an absence of 5 or more days, including absences for pregnancy and delivery.
* Standardized to age distribution of 1970 U.S. population.

OSHA-Recordable Relative Risk for Selected Disease and Injury Categories by Occupation

Tables 19.A through 19.C present the relative risk of an OSHA-recordable event for the disease category injury and poisoning and its subcategories, sprains and strains and “other” injuries, by each occupational category. These specific disease categories were the only three with enough events to calculate relative risks.

Service workers were significantly more likely to have at least one OSHA-recordable event during 1994 for injury and poisoning (RR=2.8) and “other” injuries (RR=4.1). Crafts

and repair workers were also significantly more likely to have at least one OSHA-recordable event during 1994 for injury and poisoning (RR=3.9) and “other” injuries (RR=5.0). Nuclear specialties workers were significantly more likely to have an OSHA-recordable event due to injury and poisoning (RR=3.1) and sprains and strains (RR=4.2).

Office management and administration workers had a statistically significant decreased risk of having an OSHA-recordable event due

to injury and poisoning (RR=0.1), sprains and strains (RR=0.1), and “other” injuries (RR=0.1). Engineers, scientists, and health care workers were also at a significantly decreased risk for injury and poisoning (RR=0.2).

Occupational Category	Person-Years	Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Office Management and Administration	932	4	0.1	0.1	0.4
Engineers, Scientists, and Health Care	525	2	0.2	0.04	0.7
Technical Support	340	11	2.1	1.0	4.1
Other Management and Administration	210	1	0.2	0.02	1.4
Service	179	9	2.8	1.4	5.9
Crafts and Repair	242	14	3.9	2.0	7.5
Nuclear Specialties	218	12	3.1	1.6	6.1
TOTAL	2,646	53			

Table 19.A.
Injuries and Poisoning

Occupational Category	Person-Years	Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Office Management and Administration	932	1	0.1	0.01	0.7
Engineers, Scientists, and Health Care	525	1	0.2	0.03	1.4
Technical Support	340	4	1.7	0.5	5.6
Other Management and Administration	210	1	0.5	0.1	4.3
Service	179	4	3.0	1.0	9.1
Crafts and Repair	242	5	3.0	1.0	8.5
Nuclear Specialties	218	6	4.2	1.6	11.5
TOTAL	2,646	22			

Table 19.B.
Injuries and Poisoning:
Sprains and Strains

Occupational Category	Person-Years	Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Office Management and Administration	932	1	0.1	0.01	0.6
Engineers, Scientists, and Health Care	525	1	0.2	0.02	1.3
Technical Support	340	3	1.4	0.4	4.9
Other Management and Administration	210	0			
Service	179	5	4.1	1.5	11.4
Crafts and Repair	242	8	5.0	2.0	12.5
Nuclear Specialties	218	5	2.7	1.0	7.4
TOTAL	2,646	23			

Table 19.C.
Injuries and Poisoning:
“Other” Injuries

* Persons with multiple events during the time period were counted only once.

** Adjusted for age and gender — compared with all occupational categories.

OSHA-Recordable Relative Risk for All Diseases and Injuries by Occupation

In Tables 19.A through 19.C, and 20, the risk of one or more OSHA-recordable events associated with selected diagnostic categories for specific occupational categories is compared with all other occupational categories in the Fernald work force.

In contrast to the previous series of tables, these analyses examine the risk of a worker having one or more

OSHA-recordable events during 1994. This was done to minimize the problem associated with one person having multiple events for the same condition. Again, the statistical methods used to compare the incidence of events are the relative risk and the 95% confidence interval.

Service workers (RR=2.3), crafts and repair workers (RR=3.2), and nuclear specialty workers (RR=3.4) had statistically significant increased

risks of an OSHA-recordable event in 1994 (Table 20). Office management and administrative workers (RR=0.3) and engineers, scientists, and health care workers (RR=0.2) had a statistically significant decreased risk of an event.

Occupational Category	Person-Years	Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Office Management and Administration	932	11	0.3	0.1	0.5
Engineers, Scientists, and Health Care	525	3	0.2	0.1	0.6
Technical Support	340	14	1.8	1.0	3.2
Other Management and Administration	210	2	0.3	0.1	1.2
Service	179	10	2.3	1.2	4.5
Crafts and Repair	242	15	3.2	1.7	5.9
Nuclear Specialties	218	16	3.4	1.9	6.1
TOTAL	2,646	71			

*Table 20
All OSHA-Recordable Diseases and Injuries by Occupational Categories*

* Persons with multiple events during the time period were counted only once.

** Adjusted for age and gender — compared with all occupational categories.

DIAGNOSTIC CATEGORIES

Category of Diagnoses	ICD-9-CM Code	Types of Illness in Category
All conditions	001-V82	All reported health events.
Infectious and parasitic diseases	001-139	Diseases caused by bacteria, viruses, and parasites.
Malignant neoplasms	140-208, 230-234	All cancers, regardless of the part of the body affected.
Benign neoplasms and neoplasms of uncertain behavior and unspecified nature	210-229, 235-239	Tumors that are not cancerous or that do not exhibit clearly malignant behavior, regardless of the part of the body affected.
Endocrine, nutritional and metabolic diseases, and disorders of the immune system	240-279	Diseases and conditions affecting the hormone secreting glands and organs; nutritional disorders, such as vitamin deficiency; metabolic diseases, such as diabetes and gout; and problems affecting the antibody producing system.
Diseases of the blood and blood-forming organs	280-289	Includes anemia and hemophilia, but excludes leukemia.
Mental disorders	290-319	Psychiatric diagnoses, such as dementia, schizophrenia, depression, and anxiety disorders; alcoholism; drug dependence; and eating disorders, such as bulimia.
Diseases of the nervous system and sense organs	320-389	Diseases affecting the brain, spinal cord, and peripheral nerves. Examples include meningitis; encephalitis; hereditary diseases, such as Huntington's chorea; Alzheimer's and Parkinson's disease; epilepsy; multiple sclerosis; migraine; diseases of the eye, such as cataract and glaucoma; and diseases of the ear, such as conductive hearing loss and otitis.
Diseases of the circulatory system	390-459	Diseases involving the heart, arteries, veins, and lymphatic system. Examples include rheumatic fever, heart murmurs, heart attacks, angina, hardening of the arteries, varicose veins, hemorrhoids, and phlebitis.
Diseases of the respiratory system	460-519	Includes colds, sinusitis, laryngitis, pneumonia and influenza, chronic bronchitis, asthma, and emphysema.
Diseases of the digestive system	520-579	Diseases affecting the teeth and mouth, salivary glands, digestive tract, and the abdominal cavity. Examples include dental abscess, ulcers, appendicitis, hepatitis (excluding viral hepatitis), cirrhosis of the liver, gallstones, pancreatitis, abdominal hernia, and intestinal polyps.
Diseases of the genitourinary system	580-629	Diseases affecting the kidneys, the prostate, and testes; benign breast diseases; infertility (male and female); pelvic inflammatory disease; diseases of the ovary; and menstrual disorders.
Complications of pregnancy, childbirth, and puerperium	630-676	Includes miscarriage; complications of pregnancy, such as hemorrhage; pregnancy-related high blood pressure; pre-eclampsia; premature labor or other complications of labor.
Diseases of the skin and subcutaneous tissue	680-709	Includes acne, cellulitis, sunburn, psoriasis, and seborrhea.
Diseases of the musculoskeletal system and connective tissue	710-739	Includes arthritis, systemic lupus erythematosus, ankylosing spondylitis, herniated intervertebral disc ("slipped disc"), lumbago, sciatica, rheumatism, tendinitis, and osteoporosis.
Congenital anomalies	740-759	Abnormal anatomical development present at birth. Includes spina bifida, cleft palate, harelip, and various chromosomal anomalies, such as Klinefelter's syndrome.
Certain conditions originating in the perinatal period	760-779	Conditions or diseases of the mother that can produce perinatal illness or death of the fetus or newborn. Examples include maternal high blood pressure, maternal malnutrition, ectopic pregnancy, and breech birth. Also includes other conditions originating in the perinatal period, such as fetal malnutrition or slow growth, injuries related to birth trauma, and perinatal jaundice.
Symptoms, signs, and ill-defined conditions	780-799	Symptoms, signs, abnormal results of laboratory or other tests, and conditions for which no specific diagnosis has been made. Examples include blackout, chills, dizziness, fatigue, pallor, abnormal weight loss, undiagnosed chest pain, and heartburn.
Injury and poisoning	800-999	Dislocation of joints; sprains and strains of joints and associated muscles; concussions; bruises; cuts; internal injuries due to crushing, puncture, tearing, or blunt impact; burns; blisters; poisoning; frostbite; heat stroke; and complications of medical or surgical care.
Fractures, all sites	800-829	Cracks or breaks of any bone.
Dislocations	830-839	Separation of a bone from its normal socket or joint.
Sprains and strains of joints and adjacent muscles	840-848	Strains include injuries to muscle from overexertion or from stretching the muscle beyond its normal limit. Sprains include injuries involving tearing or overextending the ligaments of a joint.
Intracranial injuries excluding those with skull fractures	850-854	Includes concussions, internal bruises, and hemorrhages within the skull without a fracture of the bones of the skull.
Internal injuries of the chest, abdomen, and pelvis	860-869	Includes internal injuries to the chest, abdomen, and pelvis and the organs within these areas of the body that do not involve an open wound.
Open wounds	870-897	Includes animal bites, cuts, lacerations, punctures, and amputations, excluding the arteries and veins.
Other injuries and effects of external causes	900-999	Miscellaneous injuries, including injuries to the arteries and veins, problems that occur an extended period of time after the injury has taken place ("late effects"), superficial bruises and abrasions, burns, post-injury shock, poisoning, toxic side effects of chemicals, heat stroke, electrocution, and altitude sickness.
Motor vehicle traffic accidents	E810-E819	Includes accidents involving motor vehicles alone or with other motor vehicles, pedestrians, or vehicles operated by pedals.
Other accidents	E916-E928	Includes accidents involving falling objects or machinery; accidents related to explosions; and those related to electrical current, radiation, hot or corrosive substances, noise, and overexertion.
Supplementary classifications related to personal or family history of disease	V10-V19	Covers situations in which the person is not ill or injured but has a personal or family history of problems, such as cancer, mental illness, allergies, or arthritis, that may affect his or her risk of illness.
Supplementary classifications related to health care for reproduction and child development	V20-V28	Includes problems related to pregnancy, postpartum care, contraception, outcome of delivery, and physical development of child.
Contact with health services for reasons other than illness or injury	V50-V59	Includes care for workers who have been treated previously for an illness or injury that is no longer present but who receive care to complete treatment or prevent recurrence.

GLOSSARY

Adjustment - A mathematical procedure for rates in which the effects of differences (such as age) in groups have been removed. The purpose of adjustment is to allow comparisons between two or more groups.

Epidemiologic Surveillance - The regular and systematic collection of data and interpretation of the distribution of illness, injury, and death in the DOE labor force over time.

ICD-9-CM - The ICD-9-CM (International Classification of Diseases-9th Revision-Clinical Modification) is based on the ICD-9 originally published by the World Health Organization and widely accepted as a standard for the coding of cause of death. The ICD-9-CM is required for the reporting of morbidity to all U.S. Public Health Service programs.

Diagnoses Rate - The number of new, reported health events observed among DOE workers per thousand DOE workers at risk during a given period of time.

Person-year - A unit of measurement combining persons and time equivalent to one person followed up for one year. In Epidemiologic Surveillance reports, rates are often expressed as the number of events (e.g., illness absences, injuries) per 1,000 person-years.

STATISTICAL NOTE

The age-adjusted rate was calculated using the 1970 U.S. population. The age-adjusted rate represents the hypothetical rate that would have been observed if the 1993 group had the same age distribution as the 1970 U.S. population. The age-adjusted rate is used to compare populations that differ in age. The 1970 U.S. population was selected because it is the standard most used for published morbidity data.

The illness and injury absence rate is defined as an absence due to illness or injury of 5 or more consecutive work days, divided by the total number of workers. OSHA-recordable events may or may not involve an absence from work.

The 95% confidence interval is based on the normal approximation to the binomial distribution where the calculated illness and injury absence rate falls within the interval. The true rate lies within this interval 95% of the time.